

CLAIMS

What is claimed is:

- 1 1. A method for performing operations in an electronic file system, the method
2 comprising the steps of:
3 receiving a command to perform one or more file system operations;
4 in response to said command, performing a plurality of operations including said one
5 or more file system operations;
6 wherein the step of performing the plurality of operations includes:
7 performing a first subset of said plurality of operations as part of a first
8 transaction; and
9 performing a second subset of said plurality of operations as part of a second
10 transaction that is nested in said first transaction.
- 1 2. The method of Claim 1 wherein the step of performing the plurality of
2 operations further includes the step of performing a third subset of said
3 plurality of operations as part of a third transaction that is nested in said
4 second transaction.
- 1 3. The method of Claim 1 wherein the second subset of operations are operations that
2 are triggered by an operation that belongs to said first subset of operations.
- 1 4. The method of Claim 1 wherein:
2 the step of receiving the command is performed by an entity that resides external to a
3 database server; and
4 the step of performing said plurality of operations includes said entity sending
5 database commands to said database server.
- 1 5. The method of Claim 4 wherein the step of performing said second subset includes:

2 the entity sending to the database server a savepoint command for the database server
 3 to establish a savepoint; and
 4 after the entity sends to the database server a savepoint command, the entity sending
 5 to the database server commands for performing said second subset of said
 6 plurality of operations.

1 6. The method of Claim 5 further comprising the entity responding to a failure of an
 2 operation in said second subset by sending to the database server a command to roll
 3 back to said savepoint.

1 7. The method of Claim 4 further comprising the entity maintaining a transaction list by
 2 performing the steps of:
 3 adding an entry to the tail of the transaction list when the entity sends a savepoint
 4 command to the database server to start a nested transaction; and
 5 when an operation fails, determining the savepoint to roll back to based on the entry
 6 at the tail of the transaction list; and
 7 removing the entry from the tail of the transaction list when the nested transaction
 8 fails or completes successfully.

1 8. The method of Claim 3 wherein:
 2 the one or more file system operations include an operation on a folder; and
 3 the second subset of operations includes operations associated with one or more
 4 documents within the folder.

1 9. The method of Claim 4 further comprising the steps of:
 2 the entity determining whether all operations that are to be performed as a nested
 3 transaction are read only;

if all operations that are to be performed as the nested transaction are read only, then
sending commands to perform the operations without first sending a command
to establish a savepoint; and
if all operations that are to be performed as the nested transaction are not read only,
then sending a command to establish a savepoint prior to sending commands
to perform the operations.

10. A computer-readable medium carrying instructions for performing operations in an
electronic file system, the computer-readable medium comprising instructions for
performing the steps of:
receiving a command to perform one or more file system operations;
in response to said command, performing a plurality of operations including said one
or more file system operations;
wherein the step of performing the plurality of operations includes:
performing a first subset of said plurality of operations as part of a first
transaction; and
performing a second subset of said plurality of operations as part of a second
transaction that is nested in said first transaction.

11. The computer-readable medium of Claim 10 wherein the step of
performing the plurality of operations further includes the step of
performing a third subset of said plurality of operations as part of a third
transaction that is nested in said second transaction.

12. The computer-readable medium of Claim 10 wherein the second subset of operations
are operations that are triggered by an operation that belongs to said first subset of
operations.

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1 13. The computer-readable medium of Claim 10 wherein:
2 the step of receiving the command is performed by an entity that resides external to a
3 database server; and
4 the step of performing said plurality of operations includes said entity sending
5 database commands to said database server.

1 14. The computer-readable medium of Claim 13 wherein the step of performing said
2 second subset includes:
3 the entity sending to the database server a savepoint command for the database server
4 to establish a savepoint; and
5 after the entity sends to the database server a savepoint command, the entity sending
6 to the database server commands for performing said second subset of said
7 plurality of operations.

1 15. The computer-readable medium of Claim 14 wherein the entity responds to a failure
2 of an operation in said second subset by sending to the database server a command to
3 roll back to said savepoint.

1 16. The computer-readable medium of Claim 13 further comprising instructions for
2 causing the entity to maintain a transaction list by performing the steps of:
3 adding an entry to the tail of the transaction list when the entity sends a savepoint
4 command to the database server to start a nested transaction; and
5 when an operation fails, determining the savepoint to roll back to based on the entry
6 at the tail of the transaction list; and
7 removing the entry from the tail of the transaction list when the nested transaction
8 fails or completes successfully.

1 17. The computer-readable medium of Claim 12 wherein:

the one or more file system operations include an operation on a folder; and
the second subset of operations includes operations associated with one or more
documents within the folder.

18. The computer-readable medium of Claim 13 further comprising instructions for performing the steps of:
- the entity determining whether all operations that are to be performed as a nested transaction are read only;
- if all operations that are to be performed as the nested transaction are read only, then sending commands to perform the operations without first sending a command to establish a savepoint; and
- if all operations that are to be performed as the nested transaction are not read only, then sending a command to establish a savepoint prior to sending commands to perform the operations.